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Heat Capacity Crossover Behavior of ^{3}He Near the Liquid-Gas Critical Point[1] M. WEILERT, F. ZHONG, I. HAHN, M. BARMATZ, Jet Propulsion Laboratory, California Institute of Technology, Pasadena, CA 91109-8099 — We present high-resolution measurement of heat capacity at constant volume of pure ^{3}He near the liquid-gas critical point ($T_c = 3.31K$). The measurements were performed along the critical isochore over the reduced temperature range of $10^{-5} < |T/T_c - 1| < 10^{-1}$. A pancake-shaped cell (height$\sim$0.5 mm) was used to minimize gravity rounding effects due to the diverging compressibility of the fluid. A high resolution thermometer based upon the magnetic susceptibility of $GdCl_3$ paramagnetic salt was used to obtain specific heat data close to the transition. Both adiabatic heat pulse and drift techniques were used for the measurements. The crossover behavior of the heat capacity was analyzed using a recent field theoretical renormalization group calculation based upon the ϕ^4 model.

[1]This work was carried out at the Jet Propulsion Laboratory, California Institute of Technology, under contract with the NASA.